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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/386,270	08/31/1999	JAMES B. LOVELAND	7927.90	1223

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EXAMINER	
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ART UNIT	PAPER NUMBER
2123	

DATE MAILED: 12/03/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 07-01)

Office Action Summary	Applicati n N .	Applicant(s)
	09/386,270	LOVELAND, JAMES B.
	Examin r	Art Unit
	Ayal I. Sharon	2123

-- The MAILING DATE f this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 August 1999* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *31 August 1999* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Introduction

1. Claims 1-22 of U.S. Application 09/386,270 filed on 08/31/1999 are presented for examination. This Application is a continuation of Application 08/991,148 filed 12/16/1997.

Priority

1. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. 120 as follows:
2. An application in which the benefits of an earlier application are desired must contain a specific reference to the prior application(s) in the first sentence of the specification or in an application data sheet (37 CFR 1.78(a)(2) and (a)(5)). This should appear as the first sentence of the specification following the title, preferably as a separate paragraph. The status of nonprovisional parent application(s) (whether patented or abandoned) should also be included. If a parent application has become a patent, the expression "now Patent No. _______" should follow the filing date of the parent application. If a parent application has become abandoned, the expression "now abandoned" should follow the filing date of the parent application.

3. Applicant's attention is drawn to a typographical error on the "Utility Patent Application Transmittal" form. The prior application is listed on p.1 as being **09**/991,148. Examiner assumes that applicant intended **08**/991,148.

Drawings

4. The subject matter of this application admits to illustration by drawings to facilitate understanding of the invention. (See specifications pp.4,10-11). Applicant is required to furnish drawings under 37 CFR 1.81. No new matter may be introduced in the required drawings. Figures 1-9 are described in the specification, but are not present in the application. Applicant is requested to provide these figures.

Claim Interpretations

5. Examiner interprets "morphing" (See specification: p.13, lines 8-12) as being equivalent to "changing" and "altering".
6. Examiner interprets "chamber" and "room" as being equivalent to "polyhedral object" or "polyhedral model". (See specification: p.7, lines 9-20).
7. Examiner interprets "recalculating" as being equivalent to "revising"

Claim Rejections - 35 USC § 112

8. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 1-22 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for area estimation, volume estimation, and cost estimation, it does not reasonably provide enablement for other types of "estimation polyhedrons". The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims. The specification only enables estimating the number of square feet in a certain area, or the associated costs. (See specification, p.22)

11. Claim 21 recites the limitation "said morphing step" in limitation (c). There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, mor than one year prior to the date of application for pat nt in the Unit d States.

13. The prior art used for these rejections is as follows:

14. Schmitt, F., Barsky, B., Wen-hui Du. "An Adaptive Subdivision Method for Surface-Fitting from Sampled Data". Proceedings of the 13th Annual Conference on Computer Graphics and Interactive Techniques. pp.179-188. 1986. (Henceforth referred to as "**Schmitt**").

15. Claims 1-2 and 5 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by Schmitt.

16. In regards to Claim 1, Schmitt teaches the following limitations:

> 1. A method for modeling a chamber to enable estimation of chamber attributes, comprising the steps of:
>
> (a) selecting a default polyhedron as an estimation polyhedron, said estimation polyhedron having a plurality of facets with each comprised of at least one estimation attribute including an area;
>
> (b) morphing a selected facet of said plurality of facets of said estimation polyhedron into a morphed facet to approximate said chamber undergoing estimation;
>
> (c) revising said at least one estimation attribute of said morphed facet and adjacent ones of said plurality of facets of said estimation polyhedron as modified by said morphing step; and
>
> (d) repeating said morphing and revising steps until said estimation polyhedron accurately depicts said chamber undergoing estimation.

(Schmitt, especially: Fig.11 and Fig. 12)

17. In regards to Claim 2, Schmitt teaches the following limitations:

> 2. The method as recited in claim 1, wherein:
>
> (a) said morphing step further comprises the step of when additional facets better approximate said chamber undergoing approximation, partitioning said selected facet of said estimation polyhedron into at least a first and second morphed facets to provide an improved estimation of said chamber undergoing estimation; and
>
> (b) said revising step further comprises the step of from said at least first and second morphed facets of said selected facet, including additional estimation attributes corresponding to said first and second morphed facets.

(Schmitt, especially: Fig.11 and Fig. 12)

18. In regards to Claim 5, Schmitt teaches the following limitations:

> 5. The method as recited in claim 1, wherein said selecting a default polyhedron further comprises the step of:
>
> (a) defining said default polyhedron to include:
>
> i. at least 4 facets each defined by a plurality of vertices shared by others of said at least 4 facets;
>
> ii. a surface area for each of said at least 4 facets; and

iii. a volume of said default polyhedron as bounded by each of said at least 4 facets.

(Schmitt, especially: Fig.11 and Fig. 12)

Claim Rejections - 35 USC § 103

19. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

20. The prior art used for these rejections is as follows:

21. Schmitt, F., Barsky, B., Wen-hui Du. "An Adaptive Subdivision Method for Surface-Fitting from Sampled Data". Proceedings of the 13th Annual Conference on Computer Graphics and Interactive Techniques. pp.179-188. 1986. (Henceforth referred to as "**Schmitt**").

22. MacCracken, R. and Joy, K. "Free-Form Deformations With Lattices of Arbitrary Topology". Proceedings of the 23rd Annual Conference on Computer Graphics and Interactive Techniques. pp.181-188. 1996. (Henceforth referred to as "**MacCracken**").

23. Lerios, A. et al. "Feature-based Volume Metamorphosis". Proceedings of the 22nd Annual Conference on Computer Graphics and Interactive Techniques, 1995. pp.449-456, 1995. (Henceforth referred to as "**Lerios**")

24. Edelsbrunner et al., U.S. Patent 5,850,229. (Henceforth referred to as "**Edelsbrunner**")

25. Claims 3-4 and 6-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schmitt in view of MacCracken.

26. Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lerios in view of Official Notice.

27. Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Edelsbrunner in view of Official Notice.

28. In regards to Claim 3, Schmitt teaches the following limitations:

> defining ...attributes to include a surface area correlating to said plurality of facets of said estimation polyhedron.
>
> (Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data" (abstract, p.179). However, Schmitt does not expressly teach the use of his for modeling rooms within a building.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate sub-units, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

29. In regards to Claim 4, Schmitt teaches the following limitations:

> assigning one of said plurality of facets of said estimation polyhedron an attribute;

(Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate sub-units, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

30. In regards to Claim 6, Schmitt teaches the following limitations:

> 6. A method for graphically estimating attributes of a room, comprising the steps of:
> (a) selecting a default polyhedron as an estimation polyhedron to approximate said attributes of said room, said estimation polyhedron having a plurality of facets with each comprised of at least one estimation attribute including an area;
> (b) morphing one of said plurality of facets of said estimation polyhedron to approximate said room undergoing estimation;
> (c) revising said at least one estimation attribute of said morphed facet and adjacent facets of said estimation polyhedron;
> (d) repeating said morphing and revising steps until said estimation polyhedron accurately depicts said room undergoing estimation; and
> (e) listing said estimation attributes of said estimation polyhedron as said attributes of said room.

(Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at

the time the invention was made to modify Schmitt's teachings to generate sub-units, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

31. In regards to Claim 7, Schmitt teaches the following limitations:

> 7. The method as recited in claim 6, wherein said selecting step further comprises the steps of:
> (a) assigning one of said plurality of facets of said estimation polyhedron a floor attribute of said room;
> (b) assigning each of others of said plurality of facets of said estimation polyhedron adjacent to said facet having said floor attribute a wall attribute; and
> (c) assigning one of said plurality of facets of said estimation polyhedron adjacent to said ones of said plurality of facets having said wall attribute a ceiling attribute.
> (Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate sub-units, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

32. In regards to Claim 8, Schmitt teaches the following limitations:

> 8. The method as recited in claim 6, wherein:
> (a) said morphing step further comprises the step of when additional facets better approximate said chamber undergoing approximation, partitioning said selected

> facet of said estimation polyhedron into at least a first and second morphed facets to provide an improved estimation of said chamber undergoing estimation; and
> (b) said revising step further comprises the step of from said at least first and second morphed facets of said selected facet, including additional estimation attributes corresponding to said first and second morphed facets.

(Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate sub-units, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

33. In regards to Claim 9, Schmitt teaches the following limitations:

> 9. The method as recited in claim 6, further comprising the steps of hierarchically grouping additional rooms into levels and grouping a plurality of levels into a structure.

(Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate sub-units, because doing so "allows a greater variety of deformable regions to be

defined, and thus a broader range of shape deformations can be generated".

(MacCracken, p.181, Abstract).

34. In regards to Claim 10, Schmitt teaches the following limitations:

> 10. A graphical method for estimating material requirements for a room within a structure, wherein said room is comprised of a plurality of planes, comprising:
> (a) displaying a default surface polygon, said surface polygon forming one plane of a plurality of planes of an estimation polyhedron for approximating said room, said plurality of planes each further having an estimation attribute assigned thereto;
> (b) morphing said default surface polygon into a morphed polygon to approximate a plane of said room undergoing estimation;
> (c) revising said estimation attribute of said morphed polygon and adjacent ones of said plurality of planes affected by said morphing step;
> (d) repeating said morphing and revising steps until said estimation polyhedron accurately approximates said room undergoing estimation; and
> (e) converting said estimation attributes of said estimation polyhedron into said material requirements for said room within said structure.
> (Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate sub-units, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

35. In regards to Claim 11, Schmitt teaches the following limitations:

> 11. The method as recited in claim 10, wherein:
> (a) said morphing step further comprises the step of when additional planes better approximate said room undergoing estimation, partitioning said morphed polygon of said estimation polyhedron into at least a first and second morphed polygons to provide an improved estimation of said room undergoing estimation; and

> (b) said revising step further comprises the step of from said at least first and second morphed polygons of said selected facet, including additional estimation attributes corresponding to said first and second morphed polygons.
>
> (Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate sub-units, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

36. In regards to Claim 12, Schmitt teaches the following limitations:

> 12. The method as recited in claim 11, wherein said converting said estimation attributes of said estimation polyhedron step comprises the step of:
>
> (a) converting said estimation attribute into a quantity of a specific one of said material requirements.
>
> (Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate sub-units, because doing so "allows a greater variety of deformable regions to be

defined, and thus a broader range of shape deformations can be generated".

(MacCracken, p.181, Abstract).

37. In regards to Claim 13, Schmitt teaches the following limitations:

> 13. The method as recited in claim 11, further comprising the steps of:
> (a) redefining another one of said plurality of planes of said estimation polyhedron as said default surface polygon to display, morph and revise estimation attributes associated therewith.
> (Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate sub-units, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

38. In regards to Claim 14, Schmitt teaches the following limitations:

> 14. The method as recited in claim 10, wherein said displaying step further comprises the steps of:
> (a) assigning one of said plurality of planes of said estimation polyhedron a floor attribute of said room;
> (b) assigning each of others of said plurality of planes of said estimation polyhedron adjacent to said plane having said floor attribute a wall attribute; and
> (c) assigning one of said plurality of planes of said estimation polyhedron adjacent to said ones of said plurality of planes having said wall attribute a ceiling attribute.
> (Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate sub-units, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

39. In regards to Claim 15, Schmitt teaches the following limitations:

> 15. A computer-readable medium having computer-executable instructions for performing the steps comprising:
> (a) displaying a default surface polygon, said surface polygon forming one plane of a plurality of planes of an estimation polyhedron for approximating said room, said plurality of planes each further having an estimation attribute assigned thereto;
> (b) morphing said default surface polygon into a morphed polygon to approximate a plane of said room undergoing estimation;
> (c) revising said estimation attribute of said morphed polygon and adjacent ones of said plurality of planes affected by said morphing step;
> (d) repeating said morphing and revising steps until said estimation polyhedron accurately approximates said room undergoing estimation; and
> (e) converting said estimation attributes of said estimation polyhedron into said material requirements for said room within said structure.
> (Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate sub-

units, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

40. In regards to Claim 16, Schmitt teaches the following limitations:

> 16. The computer-readable medium of claim 15 having further Computer executable instructions for performing the steps of:
> (a) said morphing step further comprises the step of when additional planes better approximate said room undergoing estimation, partitioning said morphed polygon of said estimation polyhedron into at least a first and second morphed polygons to provide an improved estimation of said room undergoing estimation; and
> (b) said revising step further comprises the step of from said at least first and second morphed polygons of said selected facet, including additional estimation attributes corresponding to said first and second morphed polygons.
> (Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate sub-units, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

41. In regards to Claim 17, Schmitt teaches the following limitations:

> 17. The computer-readable medium of claim 15, wherein said computer executable instructions for performing the step of converting said estimation attributes of said estimation polyhedron step further comprises computer-executable instructions for performing the step of:
> (a) converting said estimation attribute into a quantity of a specific one of said material requirements.

(Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate sub-units, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

42. In regards to Claim 18, Schmitt teaches the following limitations:

> 18. The computer-readable medium of claim 15, having further computer executable instructions for performing the steps of:
>
> (a) redefining another one of said plurality of planes of said estimation polyhedron as said default surface polygon to display, morph and revise estimation attributes associated therewith.
>
> (Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate sub-units, because doing so "allows a greater variety of deformable regions to be

defined, and thus a broader range of shape deformations can be generated".

(MacCracken, p.181, Abstract).

43. In regards to Claim 19, Schmitt teaches the following limitations:

> 19. The computer-readable medium of claim 15, wherein said computer executable instructions for performing the step of displaying a default surface polygon further comprises computer-executable instructions for performing the step of:
> (a) assigning one of said plurality of planes of said estimation polyhedron a floor attribute of said room;
> (b) assigning each of others of said plurality of planes of said estimation polyhedron adjacent to said plane having said floor attribute a wall attribute; and
> (c) assigning one of said plurality of planes of said estimation polyhedron adjacent to said ones of said plurality of planes having said wall attribute a ceiling attribute.

(Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate sub-units, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

44. In regards to Claim 20, Schmitt teaches the following limitations:

> 20. The computer-readable medium of claim 15, having further computer executable instructions for performing the step of hierarchically grouping additional rooms into levels and grouping a plurality of levels into a structure.

(Schmitt, especially: Fig.11 and Fig. 12)

Schmitt teaches "a method ... for surface-fitting from sampled data". However, Schmitt does not expressly teach the use of his for modeling rooms within a building, nor the use of floor, wall, and ceiling attributes.

MacCracken teaches lattice structures partitioned into sub-units (see Fig.1-6, p.188). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Schmitt's teachings to generate sub-units, because doing so "allows a greater variety of deformable regions to be defined, and thus a broader range of shape deformations can be generated". (MacCracken, p.181, Abstract).

45. In regards to Claim 21, Lerios teaches the following limitations:

21. A method for computerized modeling of a chamber to enable estimation of chamber attributes, comprising the steps of:

(a) selecting a default polyhedron as an estimation polyhedron, said estimation polyhedron having a plurality of vertices and facets with each facet having at least one estimation characteristic and comprised of at least one estimation attribute ...
(Lerios: especially Fig.1 and Abstract)

(b) dragging at least one of said plurality of verticies to alter at least one of said characteristics of a facet of said estimation polyhedron to approximate said chamber undergoing estimation:
(Lerios: especially Fig.1 and Abstract)

(c) recalculating said at least on estimation attribute of said altered facet and adjacent ones of said plurality of facets of said estimation polyhedron as modified by said morphing step; and
(Lerios: especially Fig.1 and Abstract)

(d) repeating said altering and recalculating steps until said estimation polyhedron accurately depicts said chamber such that said calculated estimation attribute accurately estimates said chamber.
(Lerios: especially Fig.1 and Abstract)

Moreover, Lerios teaches that attributes that are stored include the coordinate data and scaling factors (p.451, "Spatial Configuration" and "Inverse mapping").

However, Lerios does not explicitly teach that one estimation attribute is an area.

(a) selecting a default polyhedron as an estimation polyhedron, said estimation polyhedron having a plurality of vertices and facets with each facet having at least one estimation characteristic and comprised of at least one estimation attribute **including an area;**

Official Notice is given that it was well known in the art at the time of the invention as to how to calculate the area of a 2-dimensional object based on the coordinates of its verticies, or based on the scaling factors taught by Lerios.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Lerios with those of Official Notice in order to provide an easily understood metric for quantifying the extent of change cause by the transformation.

46. In regards to Claim 22, Lerios teaches the following limitations:

22. The method as recited in claim 21, wherein:
said altering step further comprises the step of when additional facets better approximated said chamber undergoing approximation, partitioning said selected facet of said estimation polyhedron into at least a first and a second altered facet to provide an improved estimation of said chamber undergoing estimation.; and
(Lerios: especially p.453, Fig.4)

said recalculating step further comprising the step of including additional estimation attributes corresponding to said first and second altered facets.
(Lerios: especially p.453, Fig.4)

47. In regards to Claim 21, Edelsbrunner teaches the following limitations:

21. A method for computerized modeling of a chamber to enable estimation of chamber attributes, comprising the steps of:

(a) selecting a default polyhedron as an estimation polyhedron, said estimation polyhedron having a plurality of vertices and facets with each facet having at least one estimation characteristic and comprised of at least one estimation attribute ...
(Edelsbrunner: especially Table 1 and Col.13 - Col.17)

(b) dragging at least one of said plurality of verticies to alter at least one of said characteristics of a facet of said estimation polyhedron to approximate said chamber undergoing estimation:
(Edelsbrunner: Abstract)

(c) recalculating said at least on estimation attribute of said altered facet and adjacent ones of said plurality of facets of said estimation polyhedron as modified by said morphing step; and
(Edelsbrunner: especially Fig.3 to Fig.7)

(d) repeating said altering and recalculating steps until said estimation polyhedron accurately depicts said chamber such that said calculated estimation attribute accurately estimates said chamber.
(Edelsbrunner: especially Fig.3 to Fig.7)

Moreover, Edelsbrunner teaches that attributes that are stored include the coordinate data (Col.13 - Col.17).

However, Edelsbrunner does not explicitly teach that one estimation attribute is an area.

(a) selecting a default polyhedron as an estimation polyhedron, said estimation polyhedron having a plurality of vertices and facets with each facet having at least one estimation characteristic and comprised of at least one estimation attribute **including an area;**

Official Notice is given that it was well known in the art at the time of the invention as to how to calculate the area of a 2-dimensional object based on the coordinates of its verticies.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the teachings of Edelsbrunner with those of Official

Notice in order to provide an easily understood metric for quantifying the extent of change cause by the transformation.

48. In regards to Claim 22, Edelsbrunner teaches the following limitations:

22. The method as recited in claim 21, wherein:
said altering step further comprises the step of when additional facets better approximated said chamber undergoing approximation, partitioning said selected facet of said estimation polyhedron into at least a first and a second altered facet to provide an improved estimation of said chamber undergoing estimation.; and
(Edelsbrunner: especially Col.4, lines 17-43)

said recalculating step further comprising the step of including additional estimation attributes corresponding to said first and second altered facets.
(Edelsbrunner: especially Col.4, lines 17-43)

Non-Statutory Double Patenting

49. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington,* 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

50. Claims 1-5 are rejected under the judicially created doctrine of double patenting over claims 1-5 of U.S. Patent No. 6,037,945 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows:

- The patent claims (e.g. Claim 1a) “a cost estimation polyhedron”, while the application claims “an estimation polyhedron”. It is inherent that “a cost estimation polyhedron” is “an estimation polyhedron”. Moreover, no other type of “estimation polyhedron” is enabled in the specification of the application.
- The patent claims (e.g. Claim 1b) “altering at least one of said characteristics of a selected facet”, while the application claims “morphing a selected facet”. The Microsoft Press Computer Dictionary, 3rd Edition, 1997, defines “morphing” as: “A process by which one image is gradually transformed into another…”. Examiner finds “altering” and “morphing” to be equivalent terms.
- The patent claims (e.g. Claim 1c) “revising in real time”, while the application claims “revising”. It is clear that the narrower limitation in the patent reads upon the limitation in the application.

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during

prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

51. Claims 6-9 are rejected under the judicially created doctrine of double patenting over claims 6-9 of U.S. Patent No. 6,037,945 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows:

- The patent claims (e.g. Claim 6a) “a cost estimation polyhedron”, while the application claims “an estimation polyhedron”. It is inherent that “a cost estimation polyhedron” is “an estimation polyhedron”. Moreover, no other type of “estimation polyhedron” is enabled in the specification of the application.
- The patent claims (e.g. Claim 6a) “each facet having at least characteristic and comprised of at least one estimation attribute”, while the application claims “each [facet] comprised of at least one estimation attribute”. It is inherent that these are equivalent.
- The patent claims (e.g. Claim 6b) “altering at least one characteristic of said plurality of facets”, while the application claims “morphing one of said plurality of facets”. The Microsoft Press Computer Dictionary, 3rd Edition, 1997, defines “morphing” as: “A process by which one image is gradually transformed into

another...". Examiner finds "altering" and "morphing" to be equivalent terms.

- The patent claims (e.g. Claim 6c) "revising in real time", while the application claims "revising". It is clear that the narrower limitation in the patent reads upon the limitation in the application.

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

52. Claims 10-14 are rejected under the judicially created doctrine of double patenting over claims 10-14 of U.S. Patent No. 6,037,945 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows:

- The patent claims (e.g. Claim 10a) "said plurality of planes each further having a characteristic and an estimation attribute", while the application claims "said plurality of planes each further having an estimation attribute". It is inherent that these are equivalent.
- The patent claims (e.g. Claim 10b) "altering", while the application claims "morphing". The Microsoft Press Computer Dictionary, 3rd

Edition, 1997, defines "morphing" as: "A process by which one image is gradually transformed into another...". Examiner finds "altering" and "morphing" to be equivalent terms.

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

53. Claims 15-20 are rejected under the judicially created doctrine of double patenting over claims 15-20 of U.S. Patent No. 6,037,945 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows:

- The patent claims (e.g. Claim 15b) "altering", while the application claims "morphing". The Microsoft Press Computer Dictionary, 3rd Edition, 1997, defines "morphing" as: "A process by which one image is gradually transformed into another...". Examiner finds "altering" and "morphing" to be equivalent terms.

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during

prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

54. Claims 21-22 are rejected under the judicially created doctrine of double patenting over claims 1-2 of U.S. Patent No. 6,037,945 since the claims, if allowed, would improperly extend the "right to exclude" already granted in the patent.

The subject matter claimed in the instant application is fully disclosed in the patent and is covered by the patent since the patent and the application are claiming common subject matter, as follows:

- The patent claims "a cost estimation polyhedron", while the application claims "an estimation polyhedron". It is inherent that "a cost estimation polyhedron" is "an estimation polyhedron". Moreover, no other type of "estimation polyhedron" is enabled in the specification of the application.
- The patent claims "a plurality of facets", while the application claims "a plurality of verticies". It is inherent that a set of verticies defines one or more facets. (See also patent: Fig. 4, and col.7 line 40 to col.8, line 6)

Furthermore, there is no apparent reason why applicant was prevented from presenting claims corresponding to those of the instant application during prosecution of the application which matured into a patent. See *In re Schneller*, 397 F.2d 350, 158 USPQ 210 (CCPA 1968). See also MPEP § 804.

Conclusion

55. The following prior art, made of record and not relied upon, is considered pertinent to applicant's disclosure.

56. Kent, J. et al. "Shape Transformation for Polyhedral Objects". Proceedings of the 19th Annual Conference on Computer Graphics and Interactive Techniques, 1992. pp.47-54, 1992.

57. Gregory, A. et al. "Feature-based Surface Decomposition for Polyhedral Morphing", Proceedings of the 15th Annual Symposium on Computation Geometry. pp.415-416. 1999.

58. Shneerson, M. et al. "Polyhedron Realization and Its Application to Metamorphosis". Proceedings of the 15th Annual Symposium on Computation Geometry. pp.413-414. 1999.

59. Edelsbrunner, H. et al. "Triangulating Topical Spaces", Proceedings of the 10th Annual Symposium on Computation Geometry. pp.285-292. 1994.

60. Beier, T. and Neely, S. "Feature-Based Image Metamorphosis". Proceedings of the 19th Annual Conference on Computer Graphics and Interactive Techniques, 1992. pp.35-42, 1992.

61. Miller, J. et al. "Geometrically Deformed Models: A Method for Extracting Closed Geometric Models From Volume Data", Proceedings of the 18th Annual Conference on Computer Graphics and Interactive Techniques, 1991. pp.217-226. 1992.

62. Grant, C. "Integrated Analytic Spatial and Temporal Anti-Aliasing for Polyhedra in 4-Space", Proceedings of the 12th Annual Conference on Computer Graphics and Interactive Techniques, 1985. pp.79-84. 1985.

63. Cohen, J. et al. "Two Algorithms for Determining Volumes of Convex Polyhedra", Journal of the ACM. Volume 26, Issue 3. July 1979.

64. U.S. Patent 5,950,206.

65. U.S. Patent 4,885,694.

66. U.S. Patent 4,964,060.

Correspondence Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ayal I. Sharon whose telephone number is (703) 306-0297. The examiner can normally be reached on Monday through Thursday, and the first Friday of a biweek, 8:30 am – 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kevin Teska can be reached on (703) 305-9704. Any response to this office action should be mailed to:

Director of Patents and Trademarks
Washington, DC 20231

Hand-delivered responses should be brought to the following office:

4th floor receptionist's office
Crystal Park 2
2121 Crystal Drive
Arlington, VA

The fax phone numbers for the organization where this application or proceeding is assigned are:

Official communications:	(703) 746-7239
Non-Official / Draft communications	(703) 746-7240
After Final communications	(703) 746-7238

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist, whose telephone number is: (703) 305-3900.

Ayal I. Sharon

Art Unit 2123

November 25, 2002

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